



# GIET POLYTECHNIC, JAGATPUR, CUTTACK LESSON PLAN

Discipline	Semester:-	Name of the Teaching Faculty:-
Electrical Engg.	4 <sup>th</sup>	SUDIPTAKUMARDAS
Subject:- Energy Conversion-I	No of Days/per Week Class Allotted :- 4	Semester From:-04 <sup>th</sup> Feb,2025 To:-17 <sup>th</sup> May, 2025 No of Weeks:-15
Week	Class Day	Theory/Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	1.1 D.C Generator, Explain principle of operation
	2 <sup>nd</sup>	1.2 Explain Constructional feature
	3 <sup>rd</sup>	1.3 Armature winding, back pitch, Front pitch, Resultant pitch and commutator-pitch
	4 <sup>th</sup>	1.4.1 Simple Lap winding (problems on winding diagram)
2 <sup>nd</sup>	1 <sup>st</sup>	1.4.2 Simple wave winding (problems on winding diagram)
	2 <sup>nd</sup>	1.5.1 Explain Different types of D.C. machines Shunt, Series and Compound machine with problem solving methods.
	3 <sup>rd</sup>	1.5.2 Explain Different types of D.C. machines Shunt, Series and Compound machine With problem solving methods.
	4 <sup>th</sup>	1.6. Derive EMF equation of DC generators. (Solve problems)
3 <sup>rd</sup>	1 <sup>st</sup>	1.7. Explain Armature reaction in D.C. machine & commutation.
	2 <sup>nd</sup>	1.8. Explain Methods of improving commutation (Resistance and emf commutation)
	3 <sup>rd</sup>	1.9. Explain role of inter poles and compensating winding (solve problems)
	4 <sup>th</sup>	1.10. Characteristics of D.C. Generators with problem solving methods 1.11. State application of different types of D.C. Generators.
4 <sup>th</sup>	1 <sup>st</sup>	1.12. Concept to critical resistance causes of failure of development of emf
	2 <sup>nd</sup>	1.13. Explain losses and efficiency of D.C. machines, condition for maximum Efficiency and numerical problems.
	3 <sup>rd</sup>	1.14. Explain parallel operation of D.C. Generators.
	4 <sup>th</sup>	Tutorial
	5 <sup>th</sup>	2.1 Explain basic working principle of DC motor
5 <sup>th</sup>	1 <sup>st</sup>	2.2 State Significance of back emf in D.C. Motor.
	2 <sup>nd</sup>	2.3 Derive voltage equation of Motor
	3 <sup>rd</sup>	2.4 Derive torque (Equation of Armature Torque and shaft Torque) (solve problems)
	4 <sup>th</sup>	Tutorial
	5 <sup>th</sup>	2.5.1 Explain performance characteristics of shunt, series and compound motors and Their application. (Solve problems)
6 <sup>th</sup>	1 <sup>st</sup>	2.5.2 Explain performance characteristics of shunt, series and compound motors and their application. (Solve problems)
	2 <sup>nd</sup>	2.6.1 Explain methods of starting shunt, series and compound motors
	3 <sup>rd</sup>	2.6.1 Explain methods of starting shunt, series and compound motors, (solve problems)
	4 <sup>th</sup>	2.7 Explain speed control of D.C shunt motors by 2.7.1 Flux control method
7 <sup>th</sup>	1 <sup>st</sup>	2.7.2 Armature voltage (rheostatic) Control method.
	2 <sup>nd</sup>	2.7.3 Solve problems
	3 <sup>rd</sup>	Tutorial
	4 <sup>th</sup>	2.8 Explain speed control of series motors by Flux control method and series parallel method.
	5 <sup>th</sup>	2.9 Explain determination of efficiency of D.C. Machine by break test method.
8 <sup>th</sup>	1 <sup>st</sup>	2.10 Explain determination of efficiency of D.C. Machine by Swinburne's Test method.
	2 <sup>nd</sup>	2.11.1 Explain Losses & efficiency and condition for maximum power and solve Numerical problems.
	3 <sup>rd</sup>	2.11.2 Explain Losses & efficiency and condition for maximum power and solve numerical problems.
	4 <sup>th</sup>	3.1 Explain working principle of transformer.
9 <sup>th</sup>	1 <sup>st</sup>	3.2 Explain Transformer Construction-Arrangement of core & winding in different types of transformer-Brief ideas about transformer accessories such as conservator, tank, breather explosion vent etc.
	2 <sup>nd</sup>	3.3 Explain types of cooling methods
	3 <sup>rd</sup>	3.4 State the procedures for Care and maintenance
	4 <sup>th</sup>	3.5 Derive EMF equation
10 <sup>th</sup>	1 <sup>st</sup>	3.6 Ideal transformer voltage transformation ratio
	2 <sup>nd</sup>	3.7 Explain Transformer on no load and on load phasor diagrams.
	3 <sup>rd</sup>	3.8 Explain Equivalent Resistance, Reactance and Impedance.
	4 <sup>th</sup>	3.9 Explain phasor diagram of transformer with winding Resistance and Magnetic leakage. Phasor diagram on load using upf, leading pf and lagging pf. 3.10 Explain Equivalent circuit and solve numerical problems.





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11th	1 <sup>st</sup>	3.11 Calculate Approximate & exact voltage drop of a Transformer.
	2 <sup>nd</sup>	3.12 Calculate Regulation of various loads and power factor.
	3 <sup>rd</sup>	3.13 Explain Different types of losses in a Transformer. (solve problems)
	4 <sup>th</sup>	3.14 Explain Open circuit test
12th	1 <sup>st</sup>	3.15 Explain Short circuit test
	2 <sup>nd</sup>	3.16 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	3 <sup>rd</sup>	3.17 Explain All Day Efficiency (solve problems)
	4 <sup>th</sup>	3.18 Explain determination of load corresponding to Maximum efficiency.
13th	1 <sup>st</sup>	3.19 Explain parallel operation of single phase transformer.
	2 <sup>nd</sup>	Tutorial
	3 <sup>rd</sup>	4.1 Explain constructional features of Auto transformer
	4 <sup>th</sup>	4.2 Explain Working principle of single phase Auto Transformer.
	5 <sup>st</sup>	4.3 State Comparison of Autotransformer with an two winding transformer (saving of Copper)
14th	1 <sup>st</sup>	4.4 State Uses of Auto transformer.
	2 <sup>nd</sup>	4.5 Explain Tap changer with transformer (on load and off load condition)
	3 <sup>rd</sup>	THREE PHASE TRANSFORMER 5.1 State and show Type of connection – Star-Star, Star-Delta, Delta-Star and Delta – Delta.
	4 <sup>th</sup>	5.1.2 State and show Type of connection – Star-Star, Star-Delta, Delta-Star and Delta – Delta.
15th	1 <sup>st</sup>	5.2 Explain parallel operation and state conditions for Parallel operation.
	2 <sup>nd</sup>	5.3 Maintenance schedule of power transformer.
	3 <sup>rd</sup>	Tutorial (Revision of syllabus)
	4 <sup>th</sup>	Tutorial (Revision of syllabus)

Sudip Kumar Das  
Signature of Teaching Faculty

1.2.25  
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